

NON-PUBLIC?: N
ACCESSION #: 9405170193
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Nine Mile Point Unit 1 PAGE: 1 OF 5

DOCKET NUMBER: 05000220

TITLE: Reactor Scram on Intermediate Range Monitor High Flux
Caused by Spiking Electrical Noise
EVENT DATE: 04/11/94 LER #: 94-004-00 REPORT DATE: 05/09/94

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 001

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Mr. Kenneth J. Sweet, Manager TELEPHONE: (315) 349-2462
Technical Support NMP1

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On April 11, 1994, at 1920 hours, Nine Mile Point Unit 1 (NMP1) received an automatic reactor scram initiation signal resulting in a full scram. While performing a reactor startup, a spurious Intermediate Range Monitor (IRM) "high-high" neutron flux trip occurred. At the time of the event, the plant was being started up with the mode switch in the "STARTUP" position; a reactor heat up was in progress, and reactor pressure was 810 pounds per square inch gauge (psig).

The apparent cause of this event was determined to be IRM spiking caused by electrical noise generated from actuation of relays external to the neutron monitoring system.

Immediate operator actions included commencing scram recovery activities. Additional corrective actions included determining the cause for the IRM

spiking and installing noise suppression circuits to correct the probable causes.

END OF ABSTRACT

TEXT PAGE 2 OF 5

I. DESCRIPTION OF EVENT

On April 11, 1994, at 1920 hours, Nine Mile Point Unit 1 (NMP1) received an automatic reactor scram initiation signal resulting in a full scram. At the time of the event, the plant was being started up with the mode switch in the "STARTUP" position; a reactor heat up was in progress, and reactor pressure was 810 pounds per square inch gauge (psig).

During the startup, Intermediate Range Monitor (IRM) channels 11 and 16 were bypassed because of a history of spiking. With the IRMs on range 8 and 9, normal control rod withdrawal manipulations were being performed. When control Rod 42-15 was selected and the control rod withdrawal switch was taken to "notch out," a full reactor scram occurred. The auto reactor trip annunciators were received. Personnel observing the IRM drawers in the Control Room observed the "high-high" alarm light illuminate on one or more of the IRMs. A subsequent review of the IRM chart recorders showed prominent spikes on channels 13, 14, 17 and 18, sufficient to cause a "high-high" neutron flux trip.

The Control Room operators commenced scram recovery actions. Reactor water level and pressure remained constant during the event.

II. CAUSE OF EVENT

The apparent cause of the scram was an electrical noise spike transmitted to the IRMs. The noise signal was sufficient to cause IRM channel 13, 14, 17 and 18 to trip on "high-high" neutron flux level.

The scram occurred simultaneously with the movement of rod 42-15. Post-incident testing revealed that IRM noise spikes are induced by operation of the Control Rod Drive (CRD) pressure control valve and the Reactor Manual Control System (rod movement). Additional discussions with operators revealed that CRD drive pressure was also adjusted immediately preceding the scram. Both rod movement and operation of the pressure control valve result in relay actuations which generate electro-magnetic interference (EMI). It is concluded that noise induced spikes from one or a combination of these sources caused the scram.

III. ANALYSIS OF EVENT

This event is reportable in accordance with 10 CFR 50.73 (a)(2)(iv), which requires the licensee to report "any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

TEXT PAGE 3 OF 5

III. ANALYSIS OF EVENT (cont.)

The IRM rod block and scram functions provide for reactor protection during startup, shutdown, and low power operations. Because the IRM "high-high" neutron flux trips were spurious, no actual over power event occurred. There were no safety consequences as a result of this event. The reactor scram was bounded by the NMP1 Final Safety Analysis Report (FSAR), Section 15, "Safety Analysis." There were no systems or components inoperable during the event that could have contributed to the event. The reactor scram posed no safety consequences to the health and safety of the general public or plant personnel.

IV. CORRECTIVE ACTIONS

The immediate corrective actions were for operators to perform scram recovery actions and place the plant in a stable condition.

Additional corrective actions include:

1. A Deviation/Event Report (DER 1-94-0691) was generated to track the event, the LER, and corrective actions.
2. Resistance/capacitance (RC) networks were installed across selected relay coils for the reactor manual control system in accordance with Simple Design Change SCI-0061-93. The purpose of these networks is to dissipate electrical energy more slowly which reduces the amplitude of the noise spike. Post-installation testing prior to restart and observation of IRM instruments during the subsequent startup showed noise spikes of a much lower amplitude.
3. Operating procedures were revised to allow for manual, local handwheel operation of the control rod drive pressure control valve. This action prevents noise generation from this source until such time as further design changes are implemented.
4. Niagara Mohawk is continuing to evaluate further corrective actions, with consideration being given to selected component shielding, cable rerouting and a time delay in system response, which will be

completed by the end of the 1995 refueling outage.

TEXT PAGE 4 OF 5

V. ADDITIONAL INFORMATION

A. Failed components: None

B. Previous similar events:

LER 93-06 "Reactor Scram on Intermediate Range Monitor High Flux Caused by Spiking Electrical Noise"

LER 91-08 "Reactor Scram due to Neutron Monitoring Trip While Performing a Controlled Shutdown"

LER 91-03 "Reactor Scram due to Spurious Trips of Neutron Monitor Caused by Noise and Inadequate Procedural Controls"

LER 90-19 "Reactor Scram due to Spurious Trip of Neutron Monitor Caused by Noise"

LER 87-25 "Reactor Scram due to Spurious Trip of Neutron Monitor Caused by Noise (cold shutdown)"

LER 87-16 "Reactor Scram, Turbine Trip, High Pressure Coolant Injection Mode of Feedwater Signals due to Spurious Trip of Neutron Monitor Caused by Noise (cold shutdown)"

LER 86-21 "Reactor Scram and HPCI Mode of Feedwater Initiation due to IRM Spike"

LER 84-05 "Scram Resulting from Spurious IRM Trips on Different Channels of RPS"

As evidenced by the above previous events, NMP1 has experienced multiple problems with IRM spiking. Although detector, connector and cable upgrades have improved the system performance, the chief cause of spiking, EMI noise, is yet to be completely resolved. The original installation of the electronic hardware and associated cabling renders the system vulnerable to EMI intrusion and consequent spurious actuations. Numerous design changes have been implemented in past years in attempts to reduce the noise signals and/or suppress their effects on the IRM system.

TEXT PAGE 5 OF 5

V. ADDITIONAL INFORMATION (cont.)

C. Identification of components referred to in this LER:

COMPONENT IEEE 803 EHS FUNCTION IEEE 805 SYSTEM ID

Reactor Protection System N/A JC
Reactor Pressure Vessel N/A SJ
IRM Neutron Monitoring System N/A IG
Control Rod Position Indication N/A JD
IRM Channel MON IG
Bypass Switch HS IG
Bypass Relay Coil RLY IG
Trip Indicating Light IL JC

ATTACHMENT TO 9405170193 PAGE 1 OF 1

NIAGARA
MOHAWK

NINE MILE POINT NUCLEAR STATION/ P.O. BOX 63, LYCOMING, NEW YORK
13093/TELEPHONE (315) 343-2110

Richard B. Abbott
Plant Manager - Unit #1

(315) 349-1812
(315) 349-4417 (FAX) May 9, 1994
NMP1L 0816

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

RE: Docket No. 50-220
LER 94-04

Gentlemen:

In accordance with 10 CFR 50.73 (a)(2)(iv), we are submitting LER 94-04,
"Reactor Scram on Intermediate Range Monitor High Flux Caused by Spiking
Electrical Noise."

Very truly yours,

Richard B. Abbott
Plant Manager - NMP1

RBA/AFZ/lmc
Attachment

xc: Mr. Thomas T. Martin, Regional Administrator
Mr. Barry S. Norris, Senior Resident Inspector

*** END OF DOCUMENT ***
